IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	10/529,919
Applicant (s)	:	Yalvac et al.
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TC/A.U.	:	1796
Examiner	:	J.S. Lenihan
Title	:	POLYMER COMPOSITIONS COMPRISING A LOW VISCOSITY, HOMOGENEOUSLY BRANCHED ETHYLENE/α-OLEFIN EXTENDER
Docket No.	:	60285A
Customer No.	:	00109

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R § 1.132

I, BRIAN W. WALTHER declare and state the following:

(1) I am a Product Development Leader in the Elastomer R&D Group of the Polyolefins and Elastomers Research and Development Laboratory at The Dow Chemical Company, B-1470 Building, 2301 Brazosport Blvd., Freeport, Texas 77541. I received a B.S. degree in Chemistry, in May-1979 from Bob Jones University. I received a Ph.D. degree in Physical Chemsitry, in December-1984, from The University of Tennessee.

(2) I am currently an employee of The Dow Chemical Company (hereinafter "Dow"), and have been continuously employed for Dow, as a Polymer Chemist, for over 26 years. I have worked in the area of polymer characterization and testing, and I am familiar with the rheological and mechanical properties of thermoplastic polymers, and compositions containing the same. I am a co-inventor of the invention described in U.S. Application No. 10/529,919 (hereinafter the '919 application).

(3) TPO formulations (AA, AB, AC, AD), as shown in Table 2 below, were prepared from the following components:

i) a polypropylene impact copolymer with a density of about 0.9 g/cm^3, and a melt flow rate of 35 g/10 min at 230°C / 2.16 kg (sold by Dow under the name "DOW C700-35N Polypropylene Resin"),

ii) an ethylene/1-octene copolymer (EO) with a density of 0.870 g/cm^3, and a melt index of 5.0 g/10 min at 190°C / 2.16 kg (sold by Dow under the name "ENGAGE 8200 Polyolefin Elastomer"); and

iii) a third polymer component ("Extender") as shown in Table 1 below. The term "Extender" is used to correspond to the terminology used in the '919 application.

Table 1

Extender	Polymer Type	Density[a] (g/cm^3)	Melt Index[b] I2 (g/10 min)	Brookfield Viscosity at 350°F (cP)
#7	Ethylene/1-octene copolymer	0.868	0.5	1,580,000[c]
#8	Ethylene/1-octene copolymer	0.870	30	327,000[c]
#9	Ethylene/1-octene copolymer	0.870	61	169,000[c]
#10	Ethylene/1-octene copolymer	0.870	___	355[d]
#1 from '919 Application[e]	Ethylene/1-octene copolymer	0.870	___	17,000

a) Density measured according to ASTM D 792 (the current test year was used for Extenders 7-10).
b) Melt index (I2) measured according to ASTM D 1238 (190°C / 2.16 kg) (the current test year was used for Extenders 7-10).
c) Brookfield Viscosity (T = 350°F) estimated from the measured Melt Index (I2) values using the following formula: BV = 10^(-1.1363 * log((MI + 9.3185)/3.6126) + 6.6928). See US Patent 6335410 (footnote to Table 1).
d) Brookfield Viscosity was measured using procedure described in the '919 application (see page 23).
e) See page 22 of the '919 Application.

(4) As discussed above, the TPO formulations are shown in Table 2 below. Formulations AA and AB were melt compounded using a BERSTOFF twin-screw extruder. Formulations AC and AD were melt compounded using a

KOBELCO batch mixer.

Table 2

Formulation	Extender	PP C700-35N (wt% in total formulation)	EO + Extender (wt% in total formulation)	EO (wt% in EO + Extender)	Extender (wt% in EO + Extender)
AA	#7	70.0	30.0	20.4	9.6
AB	#8	70.0	30.0	20.4	9.6
AC	#9	70.0	30.0	20.4	9.6
AD	#10[b]	70.0	30.0	20.4	9.6
6A from '919 Application[a]	#1	70.0	30.0	20.4	9.6

a) See pages 34-36 of the '919 Application.
b) Extender #10 could not be pelletized, and was thus added in a batch mode to formulation AD.

(5) The melt flow rate and the "room temperature impact resistance" of each TPO formulation were measured. The results are shown in Table 3 below.

Table 3

Formulation	Extender	Melt Flow Rate[b] (g/10 min)	RT IZOD[c] (J/m)
AA	#7	22.5	362
AB	#8	25.8	457
AC	#9	23.7	589
AD	#10	30.5	572
6A from '919 Application[a]	#1	27.90	479

a) See pages 34-36 of the '919 Application.
b) Melt Flow Rate was measured according to ASTM D 1238 (230°C / 2.16 kg) (the current test year was used for formulations AA, AB, AC and AD).
c) RT IZOD Impact was obtained at room temperature (RT) using a notched IZOD sample bar from an injection molded bar, which was end filled, and according to ASTM test D-256 (the current test year was used for formulations AA, AB, AC and AD).

(6) As shown in Table 3 above, formulation 6A, containing Extender # 1, had the best balance of melt flow rate and impact resistance of those formulations that can be compounded using a continuous extrusion process. Formulation 6A had a higher melt flow rate as compared to formulations AA, AB, and AC, and this higher melt flow rate is preferred for an optimized mold fill. The formulation AD is unacceptable because Extender #10 could not be pelletized, and required a batch-wise addition to this formulation. Extenders #1 and #7-9 can each be

pelletized, and can each be added to their respected formulations by a more efficient continuous extrusion process.

The undersigned declares further that all statements made herein of his own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements, and the like, so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date 05-Nov.-2010

Brian W. Walther

Brian W. Walther, Ph. D.